

**INFECTION—Methods and Concepts****PIN21****USE OF EVIDENCE BASED MODELS TO DEMONSTRATE THE LONG-TERM CLINICAL BENEFITS OF HPV VACCINATION****Bernard L<sup>1</sup>, Lindsay L<sup>2</sup>, Rogoza R<sup>1</sup>, Kohli MA<sup>1</sup>, Franco EL<sup>3</sup>**<sup>1</sup>I3 innovus Research Inc, Burlington, ON, Canada, <sup>2</sup>GSK Biologicals, Rixensart, Belgium, <sup>3</sup>McGill University, Montreal, QC, Canada

**OBJECTIVES:** Health authorities are keen to understand the clinical benefits and mortality reduction afforded by HPV vaccination for cervical cancer. Complex decision models are not always the most attractive nor the most appropriate means to highlight these benefits. The objective was to develop a relatively simple model to explore the population level impact of an HPV16/18 vaccine. **METHODS:** We developed a Monte Carlo model that estimated the absolute number of HPV infections, cervical cancer cases and deaths over the lifetime of a cohort of women. The model estimated the cancer cases and mortality avoided in the presence of vaccination (base-case: 75% vaccine uptake; 95% lifetime efficacy). **RESULTS:** Four countries were selected including Germany, Poland, Mexico and Taiwan. Each country has unique patterns of cervical cancer incidence, HPV-type prevalence and cervical cancer screening programs. The model predicted 4584, 4642, 4162 and 37,935 cases of cervical cancer over the lifetime of unvaccinated 10 year-old girls in each of Poland, Germany, Taiwan and Mexico, respectively. Vaccination resulted in a reduction of total cervical cancer cases and deaths of 2392 and 1042 respectively in Poland; 2423 and 857 in Germany; 2143 and 930 in Taiwan and 16,780 and 8381 in Mexico. Sensitivity analyses showed the most critical factors in maximizing the benefits of vaccination include vaccine uptake, efficacy, and duration of the protection. **CONCLUSIONS:** Monte Carlo simulation modeling can be a very powerful tool in understanding the potential benefits of vaccination against HPV infection for reducing cervical cancer and specific mortality.

**PIN22****USE OF PHARMACOKINETIC-PHARMACODYNAMIC MODELING WITH MONTE CARLO SIMULATION TO REDUCE ANTIBIOTIC EXPENDITURES WITHOUT COMPROMISING PREDICTED EFFICACY****Frei CR<sup>1</sup>, Lewis JS<sup>2</sup>, Burgess DS<sup>1</sup>**<sup>1</sup>University of Texas at Austin and University of Texas Health Science Center at San Antonio, San Antonio, TX, USA, <sup>2</sup>University of Texas at Austin and University of Texas Health Science Center at San Antonio and University Health System, San Antonio, TX, USA

**OBJECTIVES:** Cefepime (CPM) 2 g q8h is FDA-approved for the empiric treatment of patients with febrile neutropenia. Pharmacokinetic-pharmacodynamic (PK-PD) studies have demonstrated that cephalosporin efficacy is associated with the percent-time that the free drug concentration exceeds the minimum inhibitory concentration (free %T > MIC). This study compares the free %T > MIC achieved by CPM 2 g q8h to four alternative cefepime regimens in an attempt to determine whether antibiotic expenditures can be reduced without compromising predicted efficacy. **METHODS:** MIC distributions for Enterobacteriaceae, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii* were extracted from the 2002 Intensive Care Unit Surveillance System database. A 10,000-subject Monte Carlo simulation was executed for each species/regimen pair using published PK parameters and these MIC distributions. Cefepime probabilities of target attainment (PTA) were determined for PK-PD targets of ≥50, 60, and 70%T > MIC. PTA for CPM 2 g q8h was compared to the PTA of four alternative regimens. **RESULTS:** Overall, the 2002 ISS database contained 3543 Enterobacteriaceae (percent sus-

ceptible, 95%), 1260 *P. aeruginosa* (53%), and 271 *A. baumannii* (36%) isolates. All CPM regimens achieved a PTA similar to that of CPM 2 g q8h against Enterobacteriaceae suggesting an opportunity for cost minimization. In addition, CPM 1 g q6h achieved equivalent or higher PTA than CPM 2 g q8h against *P. aeruginosa*, and *A. baumannii* suggesting that the former regimen could be used to achieve similar predicted efficacy at a fraction of the daily cost (4g/d vs. 6g/d). However, the PTA vs. *P. aeruginosa* and *A. baumannii* was considerably lower for CPM 1 g q8h, 1 g q12h, and 2 g q12h compared to CPM 2 g q8h suggesting that these regimens may not be suitable alternatives for *P. aeruginosa* or *A. baumannii*. **CONCLUSION:** PK-PD models with Monte Carlo simulation demonstrate that cefepime 1 g q6h results in similar predicted efficacy to cefepime 2 g q8h despite a reduction in total daily drug of 2 g/d.

**PIN23****A REVIEW OF HERD EFFECTS IN THE ECONOMIC EVALUATION OF CHILDHOOD VACCINATIONS****Vicente C<sup>1</sup>, McKinnon K<sup>1</sup>, Ciuryla V<sup>2</sup>, Han D<sup>1</sup>**<sup>1</sup>Wyeth Pharmaceuticals, Markham, ON, Canada, <sup>2</sup>Wyeth Research, Collegeville, PA, USA

**OBJECTIVES:** Many childhood vaccines not only protect those directly immunized, but also indirectly prevent infection or disease in the non-immunized population through herd effects. Our objectives were to review the methodological approaches of including indirect benefits of herd effects in economic evaluations of childhood vaccines and to describe the sensitivity of the cost-effectiveness results to herd effects. **METHODS:** An extensive systematic review of the literature was conducted. The EMBASE, MEDLINE, Biosis and Current Contents databases were reviewed from 1995–2005. Two independent researchers reviewed titles and abstracts of each article. Additional articles referenced in our primary search were reviewed for further inclusion. Articles meeting inclusion criteria were blinded. Two independent researchers then reviewed and extracted data from all included articles. The quality of each included article was assessed and any discrepancies were resolved through consensus. **RESULTS:** Our primary search resulted in 27 titles being identified. Four articles met our inclusion criteria and 23 articles were excluded (7 review papers, 7 non-economic, 7 did not include herd effects and 2 did not assess a childhood vaccine). In each economic evaluation, sensitivity analyses demonstrated that the models were highly sensitive to variations in the estimates of herd effects. In reviewing how herd effects were being captured, various key issues were noted: 1) the source of herd effects and the generalizability from one population to another; 2) the association between herd effects and the vaccine; and 3) implications of a static or dynamic approach to incorporate indirect benefits. **CONCLUSION:** The indirect benefits attributed to herd effects have been documented for several vaccines. Economic evaluations have been highly sensitive to variations in herd effects. Improving the precision of measured outcomes attributed to herd effects in future economic evaluations will advance research in this field and assist in health policy decision-making.

**MUSCULAR-SKELETAL DISORDERS—Clinical Outcomes Studies****PMSI****HEALTH TECHNOLOGY ASSESSMENT: EXTRACORPOREAL SHOCK WAVE THERAPY (ESWT) FOR THE TREATMENT OF CHRONIC PLANTAR FASCIITIS****Seybold P<sup>1</sup>, Marangos PJ<sup>1</sup>, Papatheofanis FJ<sup>2</sup>**<sup>1</sup>Aequitas, San Diego, CA, USA, <sup>2</sup>UCSD, SAN DIEGO, CA, USA

**OBJECTIVES:** Chronic plantar fasciitis (CPF), the most common cause of plantar heel pain, lacks an optimal treatment standard. The electromagnetic Epos® Ultra (EPOS) and the electrohydraulic OssaTron® (OSSA) are the only two FDA approved extracorporeal shock wave therapy (ESWT) devices for CPF. This assessment will examine the net health outcomes obtained when using either of these devices in the treatment of CPF in patients who failed to achieve satisfactory improvement with initial conservative treatment. **METHODS:** Medline® MeSH heading searches of published peer-reviewed clinical literature identified all relevant studies that analyzed ESWT for the treatment of CPF dating to 1996. Additionally, conferences of professional organizations were searched for appropriate posters and abstracts. Outcomes measures focused on the ability of the comparators to reduce pain and the occurrence of adverse events. **RESULTS:** Treatment with EPOS demonstrated pain relief as evidenced by visual analog scale (VAS) score improvement from baseline and compared to control. When compared to control group, VAS score improvement at 3 months post treatment with ESWT was significantly greater ( $p = 0.0149$ ). When compared to baseline VAS scores, the improvement seen at 3, 6, and 12 months post treatment was also significantly greater ( $p < 0.05$ ). Adverse events in patients using EPOS were limited to pain at the time of application, which resolved after the treatment was completed. Treatment with OSSA resulted in greater pain relief than placebo, revealing an improved VAS score of approximately 1.0 to 2.5 points. Minor adverse events appearing in the area where the shock wave was applied were resolved within six weeks. Studies also revealed that ESWT as a whole improved patients' mobility scores by 38–51% ( $p = 0.001$ ) compared to baseline. **CONCLUSIONS:** The results of this assessment demonstrate that both EPOS and OSSA are safe and effective treatments for CPF patients who did not achieve adequate results with conservative treatment.

#### MUSCULAR-SKELETAL DISORDERS—Cost Studies

PMS2

##### THE COST-EFFECTIVENESS OF EXTRACORPOREAL SHOCK WAVE THERAPY FOR THE TREATMENT OF CHRONIC PLANTAR FASCIITIS

Marangos PJ<sup>1</sup>, Seybold P<sup>1</sup>, Papatheofanis FJ<sup>2</sup>

<sup>1</sup>Aequitas, San Diego, CA, USA, <sup>2</sup>UCSD, San Diego, CA, USA

**OBJECTIVE:** Plantar fasciitis (PF), the most common cause of plantar heel pain, affects middle-aged individuals and comprises 15% of overall foot-related complaints. Initial treatments for PF include non-steroidal anti-inflammatory drugs (NSAIDs), custom foot orthotics and/or corticosteroid injections into the heel. When symptoms persist beyond six months it is classified as chronic PF (CPF); two options for treatment, surgical intervention and extracorporeal shock wave therapy (ESWT), exist. This analysis will determine the cost-effectiveness of ESWT in relation to surgery for the treatment of CPF. **METHODS:** A Markov model was constructed based on established management practices for the treatment of CPF, simulating the distribution of patients into one of five health and treatment states. Cost and probability values used to populate the model were derived from appropriate Medicare reimbursement values, retail and average wholesale prices and published peer-reviewed clinical studies. Cost and effectiveness values were accumulated monthly over a 12 month period, yielding incremental cost-effectiveness ratios (ICERs) in dollars per quality-adjusted life year (\$/QALY). **RESULTS:** Model analysis reveals that surgery has a lower overall cost of treatment (\$1912 v. \$2862 respectively) and a higher overall effectiveness in comparison to ESWT (0.6742 v. 0.5750 QALY respectively). Surgery dominates ESWT due to its lower overall cost of treatment and higher effective-

ness value, resulting in a lower ICER as compared to ESWT (\$2836/QALY v. \$4977/QALY respectively). **CONCLUSION:** Based on the results of this analysis, surgery is a more cost-effective option than ESWT for the treatment of chronic plantar fasciitis; however, the ICER of each of these methods fall below the commonly accepted willingness-to-pay threshold of \$50,000/QALY commonly used by payers for the adoption of new technology. Therefore when surgery has failed, or is not an option, ESWT remains a viable and cost-effective alternative.

#### MUSCULAR-SKELETAL DISORDERS—Health Care Use & Policy Studies

PMS3

##### COMPARISON OF HOSPITAL COST WITH DRG REIMBURSEMENT RATE IN PATIENTS WITH PERITROCHANTERIC FRACTURE ACCORDING TO SURGICAL METHODS

Fodor B<sup>1</sup>, Naumov I<sup>1</sup>, Sebestyén A<sup>2</sup>, Boncz I<sup>3</sup>, Borsiczky B<sup>1</sup>, Nyárády J<sup>1</sup>

<sup>1</sup>University of Pécs, Pécs, Hungary, <sup>2</sup>National Health Insurance Fund Administration (OEP), Pécs, Hungary, <sup>3</sup>National Health Insurance Fund Administration (OEP), Budapest, Hungary

**OBJECTIVES:** The aim of the study is to compare the real hospital cost with DRG reimbursement rate according to surgical methods in patients with peritrochanteric fractures. **METHODS:** Reimbursement data of the Hungarian Diagnosis Related Groups derive from the financial database of the National Health Insurance Fund Administration. The real hospital costs data were collected at the Traumatology Center of the University of Pécs in 2003. We calculated the following cost elements: salaries of the staff, implants, drugs, bandage, hotel (accommodation) costs. The salaries and accommodation costs were calculated for one day from the administrative records of the University. Four different surgical methods were included: Gamma nailing and Dinamic Hip Screw (DHS) providing early weight bearing; Ender nailing and fix angled plate (FAP) osteosynthesis providing gradual partial weight bearing. The average Hungarian Forint (HUF) value of one DRG cost-weight was 100,000HUF. The exchange rate: 1 USD = 230HUF. **RESULTS:** The average DRG cost-weights: 2.87 for DHS, Ender nailing and FAP osteosynthesis, and 4.47 for Gamma nailing. The average accommodation cost was 13,276HUF/patient/day. The average cost of wages: 19,985HUF/patient/day. Drug cost: 404HUF/day. Implants: FAP: 21,300HUF; Ender nail: 3780HUF; DHS: 33,400HUF; Gamma nail: 55,400HUF. The number of average length of stay was: Gamma nailing and DHS: 8 days, Ender nailing 10 days, FAP osteosynthesis 13 days. Comparing the DRG reimbursement with the calculated hospital cost we received the further balance: Gamma nailing: +122,280HUF; DHS: -15,720HUF; Ender nailing: -45,610HUF; FAP osteosynthesis -171,685HUF. **CONCLUSIONS:** We can conclude that DRG reimbursement exceed the real hospital costs in Gamma nailing. The hospital costs of DHS, Ender nailing and FAP osteosynthesis are higher than the DRG reimbursement therefore in these cases the hospital produces a deficit during the treatment of patients.

#### OSTEOPOROSIS—Clinical Outcomes Studies

POSI

##### ONE- AND TWO-YEAR PERSISTENT USE OF BISPHOSPHONATES REDUCES THE RISK OF OSTEOPOROTIC FRACTURES IN DAILY PRACTICE

Goettsch WG<sup>1</sup>, Van den Boogaard CH<sup>1</sup>, Breekveldt-Postma NS<sup>1</sup>, Middelhoven H<sup>2</sup>, Lynch NO<sup>3</sup>, Herings RM<sup>1</sup>

<sup>1</sup>PHARMO Institute, Utrecht, The Netherlands, <sup>2</sup>F. Hoffmann-La Roche AG, Basel, Switzerland, <sup>3</sup>GlaxoSmithKline, Greenford, UK